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ALL-IN-ONE NETWORK CABLE AND SECURITY CABLE

BACKGROUND OF THE INVENTION

1. Technical Field:

The present invention is directed to an improved network communication cable for use with computing devices. More specifically, the present invention is directed to a network communication cable that includes a cut-proof casing and locking mechanism for securing a computer to a network cable connector affixed to a structure.

2. Description of Related Art:

As computers have become more prevalent in today's society, the necessity of having a computer available practically at all times has permeated today's work environment. This is especially true when employees travel to other locations, such as customer sites and the like. In such situations, the employee will typically take a portable computer with him/her to the other location for use while the employee is operating in this other location. For example, a company issued laptop computer may be taken to the customer location and used to provide communication abilities with the employee's office work location, provide presentations, and the like.

Many times while at another location, the user's computer may not be within the user's immediate supervision. That is, for example, the employee may need to leave the computer in a particular location while attending to other matters in a different location while at the customer site. In such cases, it is important that the user be able to secure the computer from theft.

One way in which a user may secure his/her computer is by way of a dedicated security cable system which allows the user to attach a steel or other secure cable to the computing device and attach the cable to a stationary fixture. For example, a loop may be provided on the computer through which the steel cable may be passed and then secured to a fixture in an office. The steel cable may include a lock that may be engaged for ensuring that the steel cable cannot be removed by anyone other than the user.

This approach is not satisfactory for a number of reasons. First, it requires that the user purchase and carry with him/her a separate dedicated cable simply for securing the computer. Second, it requires that the computing device be augmented to include physical hardware features that allow for the attachment of the security cable to the computer.

Thus, it would be beneficial to have a mechanism for securing a computer that does not require a separate dedicated security mechanism and does not require special hardware on the computer for securing of the computer.

SUMMARY OF THE INVENTION

The present invention provides an all-in-one network communication cable and security cable apparatus for securing computing devices. The present invention combines the security aspects of a steel or other cut-proof cable with a network communication cable and provides a locking mechanism that only permits the authorized user to disconnect the all-in-one cable from the computing device and the structure mounted network communication connection jack.

In one exemplary embodiment of the present invention, a standard RJ45 Ethernet Cable is provided with a cut-proof casing and a slidable locking sheath that is capable of being slid under the depressible lever of the RJ45 connector. This locking mechanism includes a lock that may be set by the user so that the locking mechanism is not removable without the proper key or combination. The slidable locking sheath, when engaged, does not allow the lever of the RJ45 connector to be depressed.

In operation, the RJ45 connector at one end of the all-in-one cable is inserted into the network connection jack that is affixed to a structure. The RJ45 connector at the other end of the all-in-one cable is inserted into the network connection jack of a built-in network card of the computing device.

As is known in the art, in order to remove an RJ45 connector from a RJ45 connection jack once the RJ45 connector is inserted, the lever of the RJ45 connector

must be depressed. The locking sheaths of the present invention may be slid under the RJ45 connector levers after insertion of the RJ45 connectors into the network connection jacks and then secured by a lock, e.g., a padlock or combination lock. The locking sheaths are configured such that the RJ45 connector levers are not depressible. As a result, the all-in-one cable cannot be removed from the network connection jacks without the proper key or combination.

Thus, the present invention provides a convenient mechanism for securing a computing device that makes use of a network communication cable that will typically be carried by a user. Since the present invention does not require an additional piece of hardware, i.e. a dedicated security cable, it is more likely that users will make use of the all-in-one cable of the present invention as opposed to the security cable required in the prior art. Moreover, since the present invention makes use of existing hardware in computers and offices, i.e. the network communication jacks, there is no need to modify the computer to include hardware whose sole purpose is for securing the computer.

These and other features and advantages of the present invention will be described in, or will become apparent to those of ordinary skill in the art in view of, the following detailed description of the preferred embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

Figure 1 is an exemplary diagram illustrating the manner by which the all-in-one cable of the present invention may be connected to a computer and a structure in accordance with one exemplary embodiment of the present invention;

Figure 2A is a first view of a locking sheath of one exemplary embodiment of the present invention;

Figure 2B is a right-side view of the first view of the locking sheath shown in Figure 2A;

Figure 2C is a top-side view of the first view of the locking sheath shown in Figure 2A;

Figure 3 is an exemplary diagram illustrating a cross-section of a lock portion of an all-in-one cable in accordance with the present invention;

Figure 4 is an exemplary diagram illustrating the locking sheath of one exemplary embodiment in an non-engaged stated relative to the RJ45 connector; and

Figure 5 is an exemplary diagram illustrating the locking sheath of one exemplary embodiment in an engaged state relative to the RJ45 connector.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Figure 1 is an exemplary diagram illustrating a mechanism according to an exemplary embodiment of the present invention for securing a computing device to a location. The present invention will be described in terms of portable computing devices, such as laptop computers, that make use of a network cable connection in order to communicate over a network with other computing devices. However, the present invention is not limited to portable computing devices and may be used with any type of computing device, such as desktop computing devices, that communicates over a network by way of a network communication cable.

As shown in **Figure 1**, the computing device **110**, which in the depicted example is a laptop computer, is in need of being secured to a location in order to prevent theft of the laptop computer. Typically, in the prior art, a separate dedicated steel cable would be required to be passed through a hardware feature of the laptop computer **110** and then secured to a fixture within the location. The present invention, however, alleviates the need for a separate dedicated steel cable and instead integrates the features of a security cable with those of a network communication cable to provide a combined all-in-one cable **120** that serves to both secure the computing device to the location and provide network communication capability.

The all-in-one cable **120** includes a network communication cable having a cut-proof casing, preferably

made of a metal material such as steel, and locking devices **122-124** at the ends of the all-in-one cable **120**. The ends of the all-in-one cable **120** preferably include connectors (not explicitly shown) which engage connector receptacles associated with connector jacks. For example, the network communication cable aspect of the all-in-one cable **120**, in a preferred embodiment, is an Ethernet cable having RJ45 connectors at the ends of the Ethernet cable. This Ethernet cable is then encased in a cut-proof casing with locking mechanisms provided at the ends of the modified Ethernet cable, as discussed herein below.

When in operation, one end of the all-in-one cable **120** is inserted into a connector jack **130** affixed to a structure **140**, e.g. a wall, of the location. The other end of the all-in-one cable **120** is inserted into a connector jack **150**, e.g., an integrated network interface card jack, that is affixed to the laptop computer **110**.

After having connected the all-in-one cable **120** to both connector jacks **130** and **150**, locking mechanisms **122-124** are engaged at the ends of the all-in-one cable **120** so that the ends of the cable are secured to the connector jacks **130** and **150**, respectively. In this way, the ends of the all-in-one cable **120** are secured to the connector jacks **130** and **150** such that they may not be removed, the all-in-one cable **120** is cut-proof by virtue of the cut-proof casing, and thus, the laptop computer **110** is secured to the location. Moreover, while the all-in-one cable **120** provides mechanisms for securing the laptop computer **110** it also allows communication via the

same all-in-one cable **120** with a data network, such as a local area network, wide area network, the Internet, and the like.

As mentioned above, the locking mechanisms **122-124** secure the ends of the all-in-one cable **120** to connector jacks **130** and **150** associated with a structure **140** in the location and the computing device **110**. As an example, in a preferred embodiment, the locking mechanisms **122-124** include a locking sheath that is capable of being placed under the depressible lever of a standard RJ45 connector at the ends of the all-in-one cable **120** and thereby cause the lever to no longer be depressible. Since the lever must be depressed in order to disengage the connector from the connector jack, the end of the all-in-one cable **120** cannot be removed until the locking sheath is removed. The locking sheath is preferably lockable such that only the user of the laptop computing device **110** is able to remove the locking sheaths via the use of a key, combination, or other mechanism.

Figures 2A-2C illustrate various views of the locking sheath according to a preferred embodiment of the present invention. As shown in **Figures 2A-2C**, the locking sheath has a circular cross-section with a tapering diameter such that the sheath **200** has a wider diameter d1 at a back end than the diameter d2 at a front end of the sheath. The tapering of the diameter d1 to d2 is preferably such that the slope of the taper approximately matches the angle produced by a depressible lever of a standard RJ45 connector when it is engaged into an RJ45 connector jack. In this way, the lever of

the RJ45 connector will not be able to be depressed when the locking sheath is engaged and locked.

The sheath **200** includes a locking feature **210** to which a lock may be attached. In the depicted example, the locking feature **210** is configured for use with a padlock type lock that may make use of a key or combination to secure the lock, however, the present invention is not limited to such. Rather, the lock itself may be integrated into the sheath such that the locking feature includes the lock.

In the depicted example, the locking feature **210** comprises a pair of surfaces **212** and **214** protruding outward from the tapering cylindrical sheath **200** and are formed as a single piece with a back surface **216**. A gap **230** is provided between the two surfaces **212** and **214** such that a mating piece (not shown) may be slid between the two surfaces **212** and **214** into the slot **230** with the back surface **216** providing a stop for the mating piece as well as giving greater strength to the two surfaces **212-214**. The mating piece is preferably affixed or integrated into the RJ45 connector at the end of the all-in-one cable.

An opening is provided in the surfaces **212** and **214** of the locking feature **210** through which a padlock arm may be passed. When the locking sheath is engaged with the RJ45 connector such that the mating piece, which has a corresponding opening, is slid between the two surfaces **212** and **214**, the arm of the padlock may pass through the openings **220** in the surfaces **212** and **214** as well as the opening in the mating piece of the RJ45 connector. This effectively secures the sheath **200** to the RJ45 connector

such that it is not moveable without removing the padlock.

The sheath **200** and the locking feature **210** may be formed from any suitable material. In a preferred embodiment, the sheath **200** is formed from a strong plastic material having an appropriate thickness that makes the sheath **200** difficult to break. A plastic material is preferred since it will tend to not interfere with the electrical wiring of the RJ45 connector. However, if appropriate shielding is provided, the sheath **200** may be formed from a metal material as well. Of course other materials, which may be apparent to those of ordinary skill in the art, may be used without departing from the spirit and scope of the present invention.

Figure 3 is an exemplary diagram illustrating a cross-section of a lock portion of an all-in-one cable in accordance with the present invention. The illustration in **Figure 3** shows the locking sheath **310** in relation to the cable **320** and a padlock **330**.

As shown in **Figure 3**, the locking sheath **310** is slidable over the all-in-one cable **320** such that it may be placed under the depressible lever **340** of the connector **342**. The all-in-one cable **320** includes communication electrical wiring section **322** surrounded by electrical shielding **324**, which in turn is encased in the cut-proof casing **326**. The electrical wiring section **322** and electrical shielding **324** are standard network connection cable components, such as may be found in a standard Ethernet cable, while the cut-proof casing **326** is provided by the present invention. The cut-proof

casing **326** may be fashioned from any cut-poof material appropriate to the particular implementation of the present invention. In a preferred embodiment, the cut-proof casing is fashioned from steel which is shielded from the electrical wiring of the all-in-one cable by the shielding section **324**.

When engaged with the connector **342**, a mating piece **350** is slid into the opening provided between surfaces **362** and **364** of the locking feature **360** of the sheath **310**. Openings in the surfaces **362** and **364** align with an opening in the mating piece **350** such that the arm **370** of a padlock **330** may pass through the opening and be inserted into the base of the padlock for securing the sheath **310** to the connector **342**. The padlock may be secured by way of a keyed lock or combination such that the arm **370** cannot be removed from the opening in the surfaces **362**, **364** and the opening in the mating piece **350**. In this way, the sheath **310** is secured into place under the lever **340** such that the lever **340** cannot be depressed and, as a result, the connector **342** cannot be removed from the connector jack.

Figure 4 is an exemplary diagram illustrating the locking sheath of one exemplary embodiment in a non-engaged state relative to the RJ45 connector. As shown in **Figure 4**, the RJ45 connector **410** includes a mating piece **420** that is attached or integrated into the RJ45 connector **410**. This mating piece **420** is a protruding piece of material having a large enough thickness to provide strength against breaking. The mating piece **420** further includes an opening which is positioned to align

with openings **442-444** in the locking feature **440** of a locking sheath **430**.

Prior to engaging with the RJ45 connector **410**, the locking sheath **430** is slidable along the all-in-one cable **450**. That is, the diameter d2 of the front end of the sheath is large enough to provide clearance between the casing of the all-in-one cable **450** and the locking sheath **430**. The diameter d2 of the front end is also large enough to permit the locking sheath **430** to slide over the rear portion of the RJ45 connector **410**.

Since approximately half of the length of the RJ45 connector **410** will be placed within the connector jack for coupling to allow network data communication via the all-in-one cable **450**, the mating piece **420** is preferably located in a rear portion of the RJ45 connector **410**. The mating piece **420** not only provides a mechanism for securing the locking sheath **430** to the RJ45 connector **410** but it also provides a stop for the locking sheath **430** such that the locking sheath **430** cannot be pushed further than the mating piece **420** toward the end of the all-in-one cable **450**.

Figure 5 is an exemplary diagram illustrating the locking sheath of one exemplary embodiment in an engaged state relative to the RJ45 connector. As shown in **Figure 5**, when the locking sheath **530** is oriented appropriately and pushed up so that the mating piece **520** slides between the surfaces of the locking feature **540**, the upper surface of the locking sheath **540** prevents depression of the lever **560** of the RJ45 connector **510**. Thus, since the lever **560** cannot be depressed, the RJ45 connector **510**

cannot be removed from the connector jack into which it is placed. As a result, the all-in-one cable **550** is secured to the connector jack by way of the locking sheath **540** and the mating piece **530** of the RJ45 connector **510**.

A portion of a lock, such as an arm of the lock, may be passed through the openings in the locking feature **540** and the mating piece **520** and used to secure the locking sheath **530** to the RJ45 connector **510**. Any type of lock that has a portion that may be passed through the openings in the locking feature **540** and the mating piece **520** may be used with this embodiment of the present invention without departing from the spirit and scope of the present invention. In a preferred embodiment, the lock may be a small luggage type keyed or combination padlock that has a curved arm that can be passed through the openings.

A locking sheath **530** and RJ45 connector **510** such as that shown in Figures 4 and 5 may be provided at each end of the all-in-one cable **550**. In this way, the all-in-one cable **550** may be secured at both ends using the locking sheaths **530**, RJ45 connectors **510**, and locks. Thus, when the all-in-one cable **550** of the present invention is properly connected to a computing device and to a connector jack associated with a structure, the computing device will be securely tethered to the structure by way of the all-in-one cable **550**. This helps to prevent theft of the computing device by making it more difficult for a would-be thief to remove the computing device from its location.

Moreover, the all-in-one cable **550**, while providing security against theft, also provides a mechanism for allowing network data communication via the all-in-one cable **550**. Thus, one cable is all that is necessary in order to both secure a computing device and connect it to a data network.

While the present invention has great advantages when used with portable computing devices, such as laptop computers, by providing a convenient mechanism for both securing the portable computing device and providing a network communication path for the portable computing device, the benefits of the present invention may also be achieved when used with more stationary computing devices. For example, the all-in-one cable of the present invention may be used with desktop systems or other computing devices that tend to be moved rarely. With the all-in-one cable of the present invention, a company may secure a computing device to an office using the mechanisms of the present invention thereby preventing theft of equipment from the company's premises while also using the all-in-one cable to provide a network connection to the company's LAN. Other uses and implementations of the present invention may be made without departing from the spirit and scope of the present invention.

In addition, while the above description provides an exemplary embodiment of the present invention, it should be appreciated that the above description is not intended to be limiting in any way with regard to the manner of implementing or the configuration of the all-in-one cable

of the present invention. For example, rather than an RJ45 connector or Ethernet cable, the present invention may make use of other types of connectors and data communication cables without departing from the spirit and scope of the present invention so long as there is a way for securing the cable to a computing device and to a connector jack of a structure.

Moreover, while the present invention has been described in terms of a sheath that is slidable under a depressible lever of a RJ45 connector, the present invention is not limited to such. Rather, any configuration of the sheath may be used that makes it unlikely for the RJ45 connector to be removed from a connector jack. For example, rather than sliding under the depressible lever, the sheath may be large enough to cover the lever and thereby make it difficult to depress the lever.

Additionally, other embodiments for securing the locking sheath in position relative to the depressible lever may be used without departing from the spirit and scope of the present invention. For example, protrusions may be provided in the casing of the all-in-one cable near the RJ45 connector such that the locking sheath may slide over the protrusions when in an unlocked state. However, when the locking sheath is locked, the diameter of the locking sheath is reduced to a level where the locking sheath can no longer be slid over the protrusions. In essence, the locking of the locking sheath causes the sheath to be squeezed to a smaller

diameter while still providing sufficient diameter to prevent depression of the lever of the RJ45 connector.

The description of the present invention has been presented for purposes of illustration and description, and is not intended to be exhaustive or limited to the invention in the form disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art. The embodiment was chosen and described in order to best explain the principles of the invention, the practical application, and to enable others of ordinary skill in the art to understand the invention for various embodiments with various modifications as are suited to the particular use contemplated.